

REMARKS

Pursuant to the present amendment, claims 1, 5, 8, 12 and 15-16 have been amended and new claims 17-21 have been added. Thus, claims 1-21 are pending in the present application. No new matter has been introduced by way of the present amendment. Reconsideration of the present application is respectfully requested in view of the amendments and arguments set forth herein.

In the Office Action, claims 1, 2-9 and 11-15 were rejected under 35 U.S.C. 102(e) as allegedly being anticipated by Brady (U.S. Patent No. 6,638,832 B2). Claims 1, 3, 8, 10 and 16 were rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Dennison (U.S. Patent No. 5,650,350). Applicants respectfully traverse the Examiner's rejections.

As the Examiner well knows, an anticipating reference by definition must disclose every limitation of the rejected claim in the same relationship to one another as set forth in the claim. *In re Bond*, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). To the extent the Examiner relies on principles of inherency in making the anticipation rejections in the Office Action, inherency requires that the asserted proposition necessarily flow from the disclosure. *In re Oelrich*, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981); *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1463-64 (Bd. Pat. App. & Int. 1990); *Ex parte Skinner*, 2 U.S.P.Q.2d 1788, 1789 (Bd. Pat. App. & Int. 1987); *In re King*, 231 U.S.P.Q. 136, 138 (Fed. Cir. 1986). It is not enough that a reference could have, should have, or would have been used as the claimed invention. "The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Oelrich*, at 326, quoting *Hansgirg v. Kemmer*, 40 U.S.P.Q. 665, 667 (C.C.P.A. 1939); *In re Rijckaert*, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993), quoting *Oelrich*, at 326; see also *Skinner*, at 1789. "Inherency ... may not be

established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *Skinner*, at 1789, citing *Oelrich*. Where anticipation is found through inherency, the Office’s burden of establishing prima facie anticipation includes the burden of providing “...some evidence or scientific reasoning to establish the reasonableness of the examiner’s belief that the functional limitation is an inherent characteristic of the prior art.” *Skinner* at 1789.

Moreover, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); M.P.E.P. § 2142. Moreover, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); M.P.E.P. § 2143.03.

With respect to alleged obviousness, there must be something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561 (Fed. Cir. 1986). In fact, the absence of a suggestion to combine is dispositive in an obviousness determination. *Gambro Lundia AB v. Baxter Health-*

care Corp., 110 F.3d 1573 (Fed. Cir. 1997). The mere fact that the prior art can be combined or modified does not make the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990); M.P.E.P. § 2143.01. The consistent criterion for determining obviousness is whether the prior art would have suggested to one of ordinary skill in the art that the process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991; *In re O'Farrell*, 853 F.2d 894 (Fed. Cir. 1988); M.P.E.P. § 2142.

Applying these legal principles, it is respectfully submitted that all pending claims are in condition for immediate allowance.

Pursuant to the present amendment, independent claim 1 has been amended to include the additional limitation of performing additional process steps to manufacture the field effect transistor, wherein a thermal budget in the manufacture of the field effect transistor is adjusted to substantially avoid silicon grid restoration in the strained surface layer. It is respectfully submitted that amended independent claim 1 is allowable over the art of record for a variety of reasons.

Brady is generally understood to be directed to a method of controlling transistor device characteristics to maintain near constant threshold voltage levels over a range of transistor channel widths. Col. 1, ll. 52-64. Brady discloses (Fig. 5; Col. 5, ll. 8-65) performing a germanium ion implant process 522 to implant germanium to a depth of between 200-1000 Å over the entire surface of the semiconductor base layer 510. The germanium implant process

522 is performed through an oxide layer 520 to reach the base layer 510, but the germanium implant does not pass through the isolation regions 518. Brady specifically notes that:

Following the implant, the wafer substrate structure 500 can be annealed in a furnace or in a rapid thermal processing (RTP) tool to anneal out the implant damage of the silicon surface of structure 500 caused by the implant of the present invention. Preferably, the wafer substrate structure 500 can be annealed at a temperature of 800-950°C for 15-45 minutes. The wafer can also be annealed in a rapid thermal annealer (RTA) at greater than (>) 950°C for approximately less than (<) 5 minutes. [Col. 5, ll. 46-55; emphasis added]

Dennison is generally understood to be directed to an SRAM cell that includes an N-type access transistor having a reduced effective electrical width which permits the size of the entire SRAM cell to be reduced. Col. 3, ll. 11-14. To that end, Dennison discloses performing a germanium ion implant process to define a germanium implant region 130. Col. 8, ll. 8-22. The germanium implant process is performed after the threshold voltage implant process is performed. The germanium implant process is performed through a pad oxide layer 102 (Figure 8). After the germanium implant is performed, the photoresist mask is stripped (Figure 9) and the pad oxide 102 is stripped (Figure 10). Col. 8, ll. 31-36. A sacrificial oxide layer 132 is then grown on the substrate (Figure 11) and a conventional unmasked enhancement implant is performed (Figure 12), *i.e.*, a threshold voltage adjust implant, preferably with boron. Col. 8, ll. 36-50. After the enhancement implant and other mask implants are performed, the sacrificial oxide 132 is stripped (Figure 13). Thereafter, a final gate oxide layer 134 is grown (Figure 14) in the exposed active area. Col. 8, ll. 62-63.

As thus understood, it is respectfully submitted that the art of record does not anticipate nor render obvious the invention defined by amended independent claim 1. For example, at no point does the art suggest the step of performing additional processing steps to manufacture the

field effect transistor when a thermal budget in the manufacture of the transistor is adjusted to substantially avoid silicon grid restoration in the strained surface layer. In fact, Brady specifically teaches that an anneal is performed to “anneal out the implant damage of the silicon surface of the structure 500 caused by the implant of the present invention.” Col. 5, ll. 49-51 (emphasis added). There is simply no suggestion in the art of record for the invention defined by the entirety of the steps set forth in amended independent claim 1, including the step discussed immediately above. If anything, the prior art, namely Brady, can be said to teach away from the present invention.

In the Office Action (page 3), the Examiner stated that “RTP is too short to fully restore a grid system,” citing Col. 5, ll. 47-57 of Brady. Applicants respectfully submit that the Examiner’s reading of Brady is directly contrary to the express statements in Brady that an anneal process is performed to anneal out the implant damage of the germanium implant. Accordingly, it is respectfully submitted that the Examiner’s reading of Brady is improper. Respectfully, to the extent the Examiner is relying on principles of inherency to find anticipation of this limitation in Brady, such reliance is improper. As set forth previously, inherency requires that a limitation necessarily follows from the disclosure of the reference. In this particular case, the Brady reference does not necessarily disclose the limitations set forth in amended claim 1. In fact, Brady specifically discloses that the opposite should occur, *i.e.*, that an anneal should be performed to anneal out the implant damage of the silicon surface due to the germanium implant. Thus, it is not understood how the principle of inherency can be relied upon to assert that a reference discloses something that is contrary to the express disclosure set forth in the reference. To the extent the Examiner would assert that the invention defined by amended independent

claim 1 is obvious in view of the art of record, it is respectfully submitted that such a position would be based on mere speculation and conjecture on the part of the Examiner. A recent Federal Circuit case makes it crystal clear that, in an obviousness situation, the prior art must disclose each and every element of the claimed invention, and that any motivation to combine or modify the prior art must be based upon a suggestion in the prior art. *In re Lee*, 61 U.S.P.Q.2d 143 (Fed. Cir. 2002). Conclusory statements regarding common knowledge and common sense are insufficient to support a finding of obviousness. *Id.* at 1434-35.

The patent to Dennison also fails to disclose the limitations as set forth in amended independent claim 1. Dennison is completely silent with respect to performing additional processing after the germanium implant process is performed wherein the thermal budget is adjusted to substantially avoid silicon grid restoration in a strained surface layer. Thus, Dennison does not anticipate, nor render obvious, the invention defined by independent claim 1.

For at least the aforementioned reasons, it is respectfully submitted that independent claim 1, and all claims depending therefrom, are in condition for immediate allowance.

Independent claim 8, as amended, is likewise believed to be allowable over the prior art of record. More specifically, it is believed that independent claim 8 is allowable for many of the reasons set forth above with respect to amended independent claim 1. Accordingly, Applicants respectfully submit that independent claim 8, and all claims depending therefrom, are in condition for immediate allowance.

Pursuant to the present amendment, independent claim 18 has been added to further define Applicants' invention. More specifically, new independent claim 18 requires forming a gate insulation layer for at least one field effect transistor on a surface of the substrate, forming a

strained surface layer on a surface of the substrate by implanting ions of at least one heavy inert material through the gate insulation layer and into the substrate, and forming at least one gate electrode structure above the gate insulation layer after forming the strained surface layer. It is believed that the invention defined by independent claim 18 is allowable over the art of record. More specifically, in Brady, the germanium implant process is performed through an oxide layer 520. As understood by the undersigned, due to the numbering scheme employed in Brady, the thin oxide layer 520 corresponds to the thin oxide layer 420 which was described as a protective oxide for the silicon surface during ion implantation to prevent contamination and to minimize the channeling of ions within the silicon base layer 110. Col. 5, ll. 13-17. Thus, it is clear from the disclosure of Brady that the thin oxide layer 520 (see description for 420 described above) is not a gate insulation layer that is formed on the surface of the semiconducting substrate. Dennison clearly does not disclose the methodology defined by independent claim 18. In Dennison, the germanium implant step is performed through the pad oxide layer 102 (see Figure 7). It is very clear that the gate insulation layer 134 is not formed until well after the germanium implant process has been performed. See Figure 14; Col. 8, ll. 62-63. In view of the foregoing, it is respectfully submitted that independent claim 18, and all claims all depending therefrom, are allowable over the art of record. Additionally, it is believed that dependent claim 20 is likewise allowable over the art of record for many of the reasons set forth above with respect to the allowability of amended independent claim 1.

In view of the foregoing, it is respectfully submitted that all pending claims are in condition for immediate allowance. The Examiner is invited to contact the undersigned attorney